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A RECONNAISSANCE IN NORTHERN ALASKA.

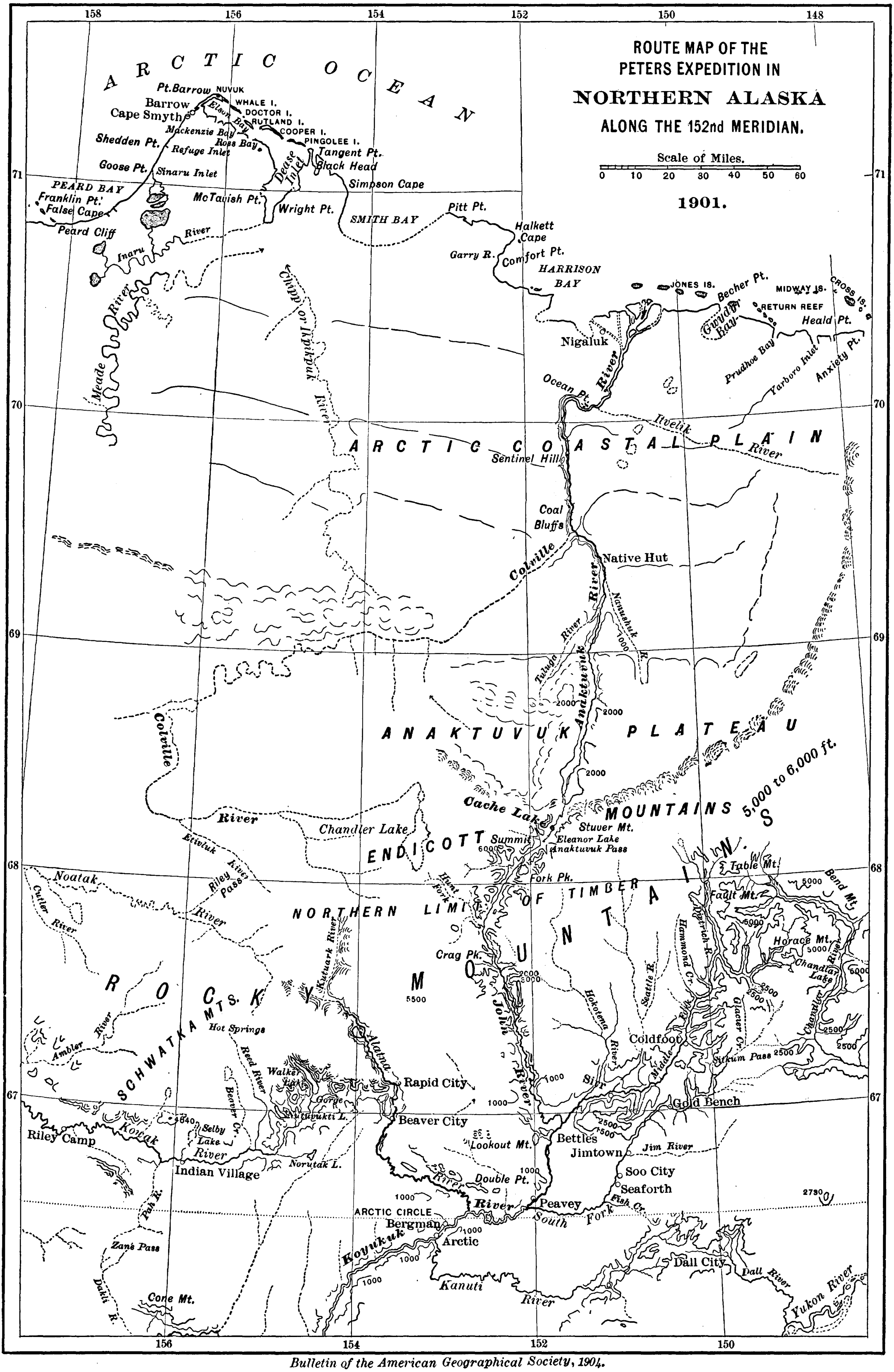
(With Map.)

The United States Geological Survey has just published under the above title (Professional Paper, No. 20) the report of F. C. Schrader on the work of the expedition in charge of W. J. Peters in 1901. Their journey was across the Rocky Mountains, along the Koyukuk, John, Anaktuvuk, and Colville Rivers, and the Arctic coast to Cape Lisburne. It was one of a network of reconnaissance traverses that have been extended over a large part of Alaska. These route surveys, preceding more detailed topographic and geologic mapping, outline the main features of the country, leaving the minuter studies to later investigators. Mr. Peters was the topographer and Mr. Schrader the geologist of the party.

Previous to 1901 only two journeys yielding geographic results had been made across northern Alaska by white men. Lieut. Howard, U. S. Navy, in 1886, crossed the country from Kowak River to Point Barrow on the Arctic coast. In 1890, J. H. Turner followed the 141st meridian from the Porcupine River to the Arctic coast. The survey made by Schrader and Peters is, however, the first carried out with precise instruments from the Yukon to the north coast of Alaska. It outlines some of the most important of the physical features and drainage channels of the northern part of the Territory. The map of the route accompanying this article is based upon one of the maps in the report.

The time devoted to actual field work—from Bergman on the Arctic Circle to Pitt Point on the Arctic coast, 513 miles—was sixty-five days. The journey was made by canoes, this mode of conveyance being interrupted only by a short portage between the upper John, a large affluent of the Koyukuk, which flows to the Yukon, and the Anaktuvuk, tributary of the Colville River, which flows to the Arctic Ocean.

The canoes started up the John River on June 13. The water was high and very swift. Snow had disappeared, except on some of the highest mountains. Occasional stops of one day each were made to ascend prominent points and carry on the mapping. The northern limit of spruce was passed on July 8. Beyond this was a thin growth of willows along the stream and its tributaries. From July 9 to 15 the river was a constant succession of rapids and dangerous rocks. On July 17 the outfit was packed over to a



Bulletin of the American Geographical Society, 1904.

MAP OF A RECONNAISSANCE IN NORTHERN ALASKA.

small lake, which was named Cache Lake. It empties into the Anaktuvuk, and the expedition was now on the Arctic slope. Numerous small lakes were found along the divide. Grayling abounded in the lakes, several caribou were shot, and goats were in considerable numbers on the mountain tops.

On July 24 the party started down the Anaktuvuk, and four days later emerged from the mountains and began to float along the rolling plateau in a fairly straight course. Mosquitoes had almost disappeared, many caribou were seen, red top grass was growing in many places, and willows several inches in diameter, with some balm of Gilead * growing to a height of thirty feet, were scattered along the banks of the river.

On August 9 the expedition ran into the Colville River, which is here 12 feet deep, 800 feet wide, and with a current running four miles an hour. Five miles below the confluence of the Anaktuvuk there is a short stretch of rapid water (six miles an hour), below which the current is not over two miles an hour. The river gradually widens to 5,000 feet at the head of the delta, which was estimated to be about 20 miles wide, with the westernmost channel probably navigable to the sea. Eskimos who were found here took the party in their boats to Point Barrow, where they arrived on September 3. Two days later they started with a whale boat for Cape Lisburne, where they caught a steamer for Nome, from which place they took the regular steamer for Seattle.

Throughout the journey north prominent points near the rivers were ascended at intervals of about ten miles for topographic sketching on the plane table. Between these stations a traverse of the rivers was made with a prismatic compass and stenometer. The plat of the traverse was transferred to the plane-table sheet and fitted to the located points. The orientation of the plane table was controlled by the azimuths, determined with the theodolite when necessary.

There are about 100 Indians on the upper Koyukuk. A settlement usually consists of a few cabins and tents, the favourite sites being at the mouth of some tributary stream. The village at Bettles, larger than most of the others, shows the tendency of the natives to remain near a trading-post. They are often employed by the whites for boating, sledding, and other work, receiving in return provisions and clothing, which, added to game and fish, give them a living. Their chief sources of food and clothing, be-

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* A name given in the United States to a variety of the *populus balsamifera.*

sides what they receive from the whites, are caribou, bear, salmon, whitefish, rabbits, grouse, and ptarmigan.

With the exception of about a dozen white persons at Cape Smyth, near Point Barrow, and some at Point Hope, the bleak Arctic coast, from the international boundary to Point Hope, 800 miles, is inhabited only by Eskimos, numbering about 1,500 persons. Their settlements are far apart, but there is yearly communication between all these points. The largest villages are at Point Hope, with a population of 314, and at Cape Smyth, with 623 Eskimos. The principal supply of food is derived from the whale, walrus, seal, polar bear, and some small fish. During the summer there are large numbers of geese and ducks. The caribou, among land animals, is most important for food and clothing. The Alaskan Eskimos are rapidly losing their racial purity, owing to admixture with other races visiting that region, chiefly on whaling vessels. Children of pure Eskimo blood are very few. About a dozen white persons live at Point Barrow, and Dr. and Mrs. Call have a mission school at the White Settlement. The Cape Smyth Whaling and Trading Company maintains a post for purposes of trade with the natives and whalers. Point Barrow is almost annually visited by steamers of the United States Revenue Service and various whaling vessels. Whaling in this part of the Arctic is now reported to be on the decline. The pursuit is hazardous, as the vessels are often caught in the pack ice.

Geographically, the region traversed consists of three well-marked provinces—the mountain or middle, the Koyukuk or southern, and the Arctic slope or northern. The most striking is the middle or mountain province, which consists of an inland range of rugged mountains trending east and west.

These mountains, at the place where they were crossed, have a width of about 100 miles, an average elevation of about 6,000 feet, and are a part of the northwestern continuation of the Rocky Mountain system. They stretch east and west through the region marked "Rocky Mountains" on the map. Where the main range appears in Canada, between the international boundary and the Mackenzie River, it is called the Davidson Mountains. The several small groups further north between the main range and the coast, extending from the 138th to the 148th meridians, have received the names Richardson, Buckland, British, Romanzoff, and Franklin. They are all probably more or less closely connected with the main range, and seem to represent the northward dying out of the mountains near the Arctic coast.

These more northern groups are usually between 2,000 and 4,000 feet high; while the height of the main range is from 5,000 to 7,000 feet. The part of the main range through which the expedition passed is a portion of the Endicott Mountains discovered and named by Allen in 1885.

Where crossed by the Geological Survey party the range lies between the rolling, hilly country of the Koyukuk Basin on the south and a very gently-undulating plateau country on the north. On the south the rise from the rolling country to the mountains is by foothills, but rapid. On the north the mountains break off abruptly and steeply, and pronounced faulting and uplift are shown by fault scarps and marked deformation of the strata. The topography of the range varies according to the character and structure of the rock formations. The slates, quartzites, and conglomerates are marked by sharper crests and peaks than the limestone areas, whose ridges are broader and more rounded, and often bordered by steep cliffs with extensive slopes of heavy talus at their foot.

The line of profile extending through the entire region from the Koyukuk to the Arctic traverses for the first 120 miles an undulating country, whose low, rounded hills attain elevations of from 1,000 to 3,000 feet. It then crosses the rugged range of mountains, 100 miles wide and about 6,000 feet high. Then it descends steeply to an elevation of 2,500 feet at the inland edge of a gently northward-sloping plateau of rolling plains. It traverses this rolling plain for 80 miles, and thence passes for about 80 miles through a nearly flat tundra country or coastal plain to the Arctic coast.

In the portion of the mountain range crossed by the survey party the drainage is chiefly south into the Koyukuk. The master stream is the John River, which rises near the northern edge of the range. Though the John valley is among mountains, and contains some cañons, it is broad, and generally open, occupying about one and a half miles from base to base of the mountains. In places, however, the valley is much wider, and the river describes great bends from side to side. The present channel has apparently been sunk into several older valley floors, as is shown by the bed-rock benches along the sides of the valley. These benches occur at heights of 1,700 to about 100 feet above the present stream, and seem to mark stages of comparative rest in the progress of orographic uplift.

The Koyukuk or southern province lies chiefly in the northwestern part of the large basin of the Koyukuk. It consists mainly of a rolling or hilly country of known or supposed Mesozoic rocks, whose hills rise to elevations of 1,000 to 3,000 feet; while the main valley floors are approximately 600 feet above sea-level. The drainage is to the Yukon, the master stream being the Koyukuk, which is navigable to near the 67th parallel.

The Arctic slope province embraces almost the whole of the Colville basin, and consists, primarily, of two distinct features—plateau and coastal plain. The name Anaktuvuk Plateau is proposed for the gently-rolling plateau above referred to. It is composed of Mesozoic rocks, and extends with gentle slope northward for 80 miles.

North of the plateau the Arctic coastal plain descends to sea-level, with slope so gentle as to be inappreciable to the naked eye. The flat surface is dotted with very shallow ponds, which, in most instances, are without outlet. Along the west side of the Colville the eroded edge of this part of the plain forms continuous steep bluffs, which decrease in height from 200 feet, at the mouth of the Anaktuvuk, to about 80 feet at Ocean Point, 40 miles further north. The master stream of the Colville River has a drainage basin of about 30,000 square miles. It rises in the northern part of the Endicott Mountains, makes a long detour to the west and back, and traverses both the Anaktuvuk Plateau and the coastal plain.

The Arctic coast, from the mouth of the Mackenzie to Point Barrow, is low and flat, the actual shore-line being formed by a low shelving beach whose seaward extension forms the shallow sea-floor. The surface of the tundra often descends to within a few feet of tide-level. It is inferred that the coastal shelf extends far offshore.

The geological structure of the country traversed is treated at great length, but only a few of the facts reported can be included in this summary. The rocks of the section along the route comprise representatives of most of the geologic ages, ranging from Silurian to Pleistocene. The oldest rocks consist of several metamorphic series, principally of sedimentary origin, which have acquired their present character largely by processes of mountain-building. These metamorphic rocks are exposed only in the mountainous portion of the field. Igneous rocks were not observed unless at one place on the John River, where, at a distance, the limestone appears to be cut by the intrusion of dikes.

A series of tertiary terranes underlies the flat tundra country. Glaciation in geologically recent time has been far more extensive than was supposed. There is much evidence of ice action in the valleys within the Endicott range and in the Koyukuk province.

There are indications of mineralization nearly all the way northward through the Endicott Mountains, but the principal producing region is on the upper part of the middle and north forks of the Koyukuk River. Though this region contains coal and some lead, copper, and antimony, gold alone has thus far proved to be of economic importance. Coal in one form or another occurs in the Koyukuk range, on the Anaktuvuk plateau, on the coastal plain, and at several points along the coast.

In addition to the topographic and geologic maps, the report is beautifully illustrated with numerous photographs, showing all the different aspects of the country, including the valley of the John, the Endicott Mountains, the Anaktuvuk plateau, the bluffs along the Colville, the Arctic coast, and the edge of the moss-covered coastal plain.

THE POPULATION OF INDIA.

The India Office now issues as a Blue-Book the voluminous General Report and tables—monuments of unpretentious learning and patient labour that form a fitting close to the herculean task of numbering nearly 300,000,000 people. The primary responsibility for the census fell upon Mr. H. H. Risley, C.I.E., who acknowledges his indebtedness to the army of 1,457,400 persons who aided him.

Of the total area of India, 1,766,597 square miles, 61.5 per cent. is under direct British administration, as is also 78.8 per cent. of the total population, 294,361,056. The native States, while comprising over one-third of the area, include much less than one-quarter of the people. The largest British province is Burma; but the most populous is Bengal, with 78,500,000 persons, or practically a population as large as that of the United States. Next come the United Provinces, 48,500,000, and Bombay, 42,500,000. Haidarabad with 11,000,000 stands first among the native States.

The most important factors affecting the rural distribution of population are the amount and regularity of the water supply. The most densely-peopled tract in India, a Cochin taluk,* with 1,920 per square mile, has the heaviest and most regular rainfall; while

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* *Taluk* is a subdivision of a district.